

**Table F-25.** Summary of ERA HQs for NOAA Grid Area 3.

COPCs Receptors	2,4,6-TNT TN HQs	Nitrate HQs	RDX HQs
Deer mouse	60	—	10
Loggerhead shrike	—	2	—
Mule deer	7	2	1
Pygmy rabbit	100	2	<b>20</b>
Sage sparrow	—	5	—
<u>Townsend's western big-eared bat</u>	—	3	—

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at NOAA Area 3 are discussed below.

- The HQs for exposure to 2,4,6-trinitrotoluene ranged from 7 for the mule deer (M122), 60 for the deer mouse (M422), to 100 for the pygmy rabbit (M122A). The EPC in the surface soil is 401 mg/kg decreasing to 20.1 mg/kg in the subsurface soil. This contaminant is well above the low risk HQ of 10.
- The HQs for exposure to nitrate ranged from 2 for the loggerhead shrike (AV322), pygmy rabbit (M122A) and deer mouse (M422); 3 for the Townsend's western big-eared bat (M210A); to 5 for the sage sparrow (AV222). The EPC in the surface soil is 300 mg/kg decreasing to 120 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Nitrite HQs at NOAA Area 3 were all below 1.0. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data.
- The HQs for exposure to RDX ranged from 1 for the mule deer (M122), 10 for the deer mouse (M422), to 20 for the pygmy rabbit (M122A). The EPC in the surface soil is 1.78 mg/kg decreasing to 0.14 mg/kg in the subsurface soil. This contaminant is above the low risk HQ of 10.

The risk evaluation indicates that Area 3 at NOAA has a risk to ecological receptors from 2,4,6-TNT and RDX.

#### Area 4

HQs for the COPCs from this area ranged from 1 to 3. Risk to plants could not be assessed for nitrate.

**Table F-26.** Summary of ERA HQs for NOAA Grid Area 4.

COPC Receptors	Nitrate HQs
Deer mouse	1
Loggerhead shrike	1
Pygmy rabbit	1
Sage sparrow	3
Townsend's western big-eared bat	3

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at NOAA Area 4 are discussed below.

- The HQs for exposure to nitrate ranged from 1 for the loggerhead shrike (AV322), pygmy rabbit (M122A) and deer mouse (M422) to 3 for the sage sparrow (AV222) and Townsend's western big-eared bat (M210A). The EPC in the surface soil is 210 mg/kg decreasing to 80.5 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that Area 4 at NOAA has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for the NOAA Grid Area 4.

#### Area 5

HQs for the COPCs from this area ranged from 1 to 500. Risks to birds and plants could not be assessed for threats from exposure to 2-amino-4,6-dinitrotoluene and 2,4,6-TNT. Furthermore, risk to plants could not be assessed for nitrate.

**Table F-27.** Summary of ERA HQs for NOAA Grid Area 5.

COPCs Receptors	1,3,5-trinitrobenzene HQs	2,4,6-TNT HQs	Nitrate HQs
Deer mouse	1	<b>300</b>	3
Mule deer	—	4	—
Pygmy rabbit	2	<b>500</b>	3
Sage sparrow	—	—	4

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at NOAA Area 5 are discussed below.

- The HQs for exposure to 1,3,5-trinitrobenzene ranged from 1 for the deer mouse (M422) to 2 for the pygmy rabbit (M122A). The EPC in the surface soil is 77 mg/kg decreasing to 30.8 mg/kg in the subsurface soil. This contaminant was eliminated as a COPC because the HQ fell below 10, which indicates a low risk to ecological receptors.
- The HQs for 2-amino-4,6-dinitrotoluene at NOAA Area 5 were all below 1.0.
- The HQs for exposure to 2,4,6-trinitrotoluene ranged from 3 for the mule deer (M122), 300 for the deer mouse (M422), to 500 for the pygmy rabbit (M122A). The EPC in the surface soil is 1,900 mg/kg to decreasing 655 mg/kg in the subsurface soil. This contaminant is well above the low risk HQ of 10.
- The HQs for exposure to nitrate were 3 for the pygmy rabbit (M122A), deer mouse (M422), and sage sparrow (AV222). The EPC in the surface soil is 410 mg/kg decreasing to 119 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that Area 5 at NOAA has a risk to ecological receptors from 2,4,6-TNT.

#### Area 6

HQs for the COPCs from this area ranged from 1 to 200. Risks to birds and plants could not be assessed for threats from exposure to 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, 2-amino-4,6-dinitrotoluene, 2,4,6-TNT, and 4-amino-2,6-dinitrotoluene. Furthermore, risk to plants could not be assessed for nitrate.

**Table F-28.** Summary of ERA HQs for NOAA Grid Area 6.

COPCs Receptors	1,3-dinitrobenzene HQs	2,4,6-TNT HQs	Nitrate HQs
Deer mouse	<b>60</b>	<b>70</b>	2
Mule deer	1	1	—
Pygmy rabbit	<b>200</b>	<b>100</b>	2
Sage sparrow	—	—	2

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at NOAA Area 6 are discussed below.

- 1,3,5-trinitrobenzene HQs at NOAA Area 6 were all below 1.0.
- The HQs for exposure to 1,3-dinitrobenzene ranged from 60 for the deer mouse (M422) to 200 for the pygmy rabbit (M122A). The EPC in the surface soil is 27 mg/kg decreasing to 10.8 mg/kg in the subsurface soil. This contaminant is well above the low risk HQ of 10.

- The HQs for 2-amino-4,6-dinitrotoluene at NOAA Area 6 were all below 1.0.
- The HQs for exposure to 2,4,6-trinitrotoluene ranged from 70 for the deer mouse (M422) to 100 for the pygmy rabbit (M122A). The EPC in the surface soil is 480 mg/kg decreasing to 192 mg/kg in the subsurface soil. This contaminant is well above the low risk HQ of 10.
- The HQs for 4-amino-2,6-dinitrotoluene at NOAA Area 6 were all below 1.0.
- The HQs for exposure to nitrate ranged from 1 for the sage sparrow (AV222) to 2 for the pygmy rabbit (M122A) and deer mouse (M422). The EPC in the surface soil is 250 mg/kg decreasing to 75.5 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that Area 6 at NOAA has a risk to ecological receptors from 2,4,6-TNT and 1,3-dinitrobenzene.

In summary, based on dose and HQ calculations and background comparisons, the primary potential risk-drivers at NOAA include 2,4,6-TNT (at Areas 2a, 3, 5, and 6), RDX (at Area 3), and 1,3-dinitrobenzene (at Area 6) in soil. The risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1. Complete results from the ERA are presented in Appendix G.

#### **F-3.9.27 Twin Buttes Bombing Range**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

#### **F-3.9.28 Fire Station II Zone and Range Fire Burn Area**

In order to characterize the Fire Station area better and because this site covers such a large area, it was divided into four separate areas. This was also done to help keep the contaminants limited to the area from which they were found. Then, if remediation was needed, it would be limited to the contaminated area and less unnecessary habitat would be destroyed. The COPCs for the ecological risk assessment include several inorganics and explosive compounds for the surface and subsurface soils. Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. These HQs and COPCs are presented in Tables F-29 through F-32. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs for the COPCs from this site ranged from 1 to 40. Risks from these contaminants to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop TRVs (as the contaminants are discussed in greater detail below, they may contain a few more data gaps because of the lack of toxicity data and will be discussed more quantitatively). Also, a few of the COPCs for this site could not be assessed for ecological risk because of the lack of toxicity information. These COPCs will be discussed in greater detail under their designated area.

##### Area 1

Hazard quotients for the COPCs from this area ranged from 1 to 20. Risks to birds and plants could not be assessed for threats from exposure to 2,4,6-TNT and RDX. Furthermore, risk to plants could not be assessed for nitrate.

**Table F-29.** Summary of ERA HQs for the Fires Station II Zone and Range Fire Burn Area 1.

COPCs Receptors	2,4,6-TNT HQs	Nitrate HQs	RDX HQs
Deer mouse	9	2	4
Loggerhead shrike	—	1	—
Pygmy rabbit	20	2	9
Sage sparrow	—	5	—
Townsend's western big-eared bat	—	3	—

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Fire Station Area 1 are discussed below.

- The HQs for exposure to 2,4,6-trinitrotoluene ranged from 2 for the mule deer (M122), 9 for the deer mouse (M422), to 20 for the pygmy rabbit (M122A). The EPC in the surface soil is 62 mg/kg decreasing to 3.15 mg/kg in the subsurface soil. This contaminant is above the low risk HQ of 10 for the pygmy rabbit.
- The HQs for exposure to nitrate ranged from 2 for the pygmy rabbit (M122A), mourning dove (AV122), and deer mouse (M422), 3 for the loggerhead shrike (AV322), 4 for Townsends' western big-eared bat (M210A), to 5 for the sage sparrow (AV222). The EPC in the surface soil is 340 mg/kg decreasing to 83.5 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to RDX ranged from 1 for the mule deer (M122), 4 for the deer mouse (M422), to 9 for the pygmy rabbit (M122A). The EPC in the surface soil is 0.78 mg/kg decreasing to 0.07 mg/kg in the subsurface soil. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that Area 1 at the Fire Station (ORD-10) has a risk to ecological receptors from 2,4,6-TNT. Risk from RDX could not be evaluated for several receptor groups, but as the detection frequency was only 0.23, it is unlikely to present a widespread exposure hazard.

#### Area 2

HQs for the COPCs from this area ranged from 1 to 40. Risks to birds and plants could not be assessed for threats from exposure to 2,4,6-TNT, 4-amino-2,6-dinitrotoluene, HMX, and RDX. Furthermore, risk to plants could not be assessed for nitrate and nitrite.

**Table F-30.** Summary of ERA HQs for the Fires Station II Zone and Range Fire Burn Area 2.

COPCs Receptors	2,4,6-TNT HQs	Nitrate HQs	Nitrite HQs	RDX HQs
Deer mouse	2	2	—	<b>20</b>
Loggerhead shrike	—	1	—	—
Mule deer	—	—	—	2
Pygmy rabbit	<b>4</b>	2	—	<b>40</b>
Sage sparrow	—	4	1	—
<u>Townsend's western big-eared bat</u>	—	2	—	—

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Fire Station Area 2 are discussed below.

- The HQs for exposure to 2,4,6-trinitrotoluene ranged from 2 for the deer mouse (M422) to 4 for the pygmy rabbit (M122A). The EPC in the surface soil is 12.8 mg/kg decreasing to 0.68 mg/kg in the subsurface soil. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- 4-amino-2,6-dinitrotoluene HQs at the Fire Station Area 2 were all below 1.0.
- HMX HQs at the Fire Station Area 2 were all below 1.0.
- The HQs for exposure to nitrate ranged from 1 for the loggerhead shrike (AV322); 2 for the pygmy rabbit (M122A), Townsend's western big-eared bat (M210A), and deer mouse (M422); to 4 for the sage sparrow (AV222). The EPC in the surface soil is 270 mg/kg decreasing to 73 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only HQ  $\geq 1$  for exposure to nitrite was a 1 for the sage sparrow (AV222). The EPC in the surface soil is 75 mg/kg decreasing to 28 mg/kg in the subsurface soil. The INEEL background value for nitrite has not been evaluated or made available at this time. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data. This contaminant was eliminated as a COPC because the HQ fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to RDX ranged from 2 for the mule deer (M122), 20 for the deer mouse (M422); to 40 for the pygmy rabbit (M122A). The EPC in the surface soil is 3.7 mg/kg decreasing to 1.5 mg/kg in the subsurface soil. This contaminant is above the low risk HQ of 10.

The risk evaluation indicates that Area 2 at the Fire Station area has a risk to ecological receptors from RDX.

### Area 3

HQs for the COPCs from this area ranged from 1 to 8. Risks to birds and plants could not be assessed for threats from exposure to chrysene, TPH, and xylene. Furthermore, risk to plants could not be assessed for nitrite. Trichlorofluoromethane was among these COPCs, but no toxicity information could be found to assess ecological risk. This contaminant was considered low risk because its concentration was found at low levels (EPC in the surface soil was 0.012 mg/kg decreasing to 0.006 mg/kg in the subsurface soil), and for this reason it is unlikely to pose significant risk to any ecological receptor and will no longer be evaluated.

**Table F-31.** Summary of ERA HQs for the Fires Station II Zone and Range Fire Burn Area 3.

COPCs Receptors	Copper HQs	TPH-diesel HQs
Deer mouse	1	1
<u>Pygmy rabbit</u>	3	8

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Fire Station Area 3 are discussed below.

- Chrysene HQs at the Fire Station Area 3 were all below 1.0.
- The HQs for exposure to copper ranged from 1 for the deer mouse (M422) to 3 for the pygmy rabbit (M122A). The EPC in the surface soil is 24.2 mg/kg decreasing to 9.12 mg/kg in the subsurface soil. The INEEL UTL background concentration for copper is 22 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQ fell below 10, which indicates a low risk to ecological receptors.
- Lead HQs at the Fire Station Area 3 were all below 1.0.
- Nitrite HQs at the Fire Station Area 3 were all below 1.0.
- Selenium HQs at the Fire Station Area 3 were all below 1.0.
- The HQs for the exposure to TPH-diesel (the EPC in the surface soil was 120 mg/kg decreasing to 15.3 mg/kg in the subsurface soil) was 8 for the pygmy rabbit (M122A). TRV values from benzene were used to evaluate this contaminant because benzene is the most hazardous chemical found in TPH-diesel. This was done because TRV values for TPH-diesel could not be developed because of the lack of toxicity data. This contaminant was eliminated as a COPC because the HQs were equal to or below 10, which indicates a low risk to ecological receptors.
- Xylene HQs at the Fire Station Area 3 were all below 1.0.

The risk evaluation indicates that Area 3 at Fire Station has limited risk to ecological receptors from exposure to soils from this area. Risk from TPH-diesel could not be evaluated for several receptor groups, but the detection frequency for this contaminant was only 0.25, and it is unlikely to present a

widespread exposure hazard. No COPCs were retained for further evaluation in the ERA for the Fire Station Area 3.

#### Area 4

HQs for the COPCs from this area ranged from 1 to 40. Risks to birds and plants could not be assessed for threats from exposure to 2,4,6-TNT. Furthermore, risk to plants could not be assessed for nitrate and nitrite.

**Table F-32.** Summary of ERA HQs for the Fires Station II Zone and Range Fire Burn Area 4.

COPCs Receptors	2,4,6-TNT HQs	Nitrate HQs	Sulfate HQs
Deer mouse	20	1	4
<u>Pygmy rabbit</u>	40	1	4

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Fire Station Study Area 4 are discussed below.

- The HQs for exposure to 2,4,6-trinitrotoluene ranged from 20 for the deer mouse (M422) to 40 for the pygmy rabbit (M122A). The EPC in the surface soil is 130 mg/kg decreasing to 48.5 mg/kg in the subsurface soil. This contaminant is above the low risk HQ of 10.
- The only HQ  $\geq 1$  for exposure to nitrate was a 1 for the pygmy rabbit (M122A) and deer mouse (M422). The EPC in the surface soil is 190 mg/kg decreasing to 35.1 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Nitrite HQs at the Fire Station Area 4 were all below 1.0. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data.

The risk evaluation indicates that Area 4 at Fire Station has a risk to ecological receptors from 2,4,6-TNT.

In summary, based on dose and HQ calculations and background comparisons, the primary potential risk-drivers at the Fire Station include 2,4,6-TNT (at Area 1 and 4) and RDX (at Area 2) in soil. Complete ERA results are presented in Appendix G. The risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

#### **F-3.9.29 Anaconda Power Line**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.



### **F-3.9.30 Old Military Structures**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

### **F-3.9.31 Mass Detonation Area (MDA)**

The COPCs for the ecological risk assessment include several inorganics and explosive compounds for the surface and subsurface soils. Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. HQs from the contaminants at this site were all below 1.0. Risks from the COPCs to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop TRVs. Risks to birds and plants could not be assessed for threats from exposure to 2,4-dinitrotoluene. Furthermore, risk to plants could not be assessed for nitrite. The HQs for the COPCs at the MDA are discussed below.

- 2,4-dinitrotoluene HQs at MDA were all below 1.0.
- Nitrite HQs at MDA were all below 1.0. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data.

The risk evaluation indicates that MDA has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for the Mass Detonation Area. The risk from UXO to ecological receptors is considered low. The complete ERA results are presented in Appendix G.

### **F-3.9.32 Dairy Farm Revetments**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

### **F-3.9.33 Experimental Field Station**

In order to characterize the Fire Station area better and because this site covers such a large area, it was divided into two separate areas. This was also done to help keep the contaminants limited to the area from which they were found. Then, if remediation was needed, it would be limited to the contaminated area and less unnecessary habitat would be destroyed. The COPCs for the ecological risk assessment include several inorganics and explosive compounds for the surface and subsurface soils. Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. These HQs and COPCs are presented in Tables F-33 and F-34. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs from the contaminants at this site ranged from 1 to 300. Risks from these contaminants to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop TRVs. (As the contaminants are discussed in greater detail below, they may contain a few more data gaps because of the lack of toxicity data and will be discussed more quantitatively.) Also, a few of the COPCs for this site could not be assessed for ecological risk because of the lack of toxicity information. These COPCs will be discussed in greater detail under their designated area.

## Area 1

HQs for the COPCs from this area ranged from 1 to 300. Risk to birds and plants could not be assessed for 4-amino-2,6-dinitrotoluene. Also, risk to plants could not be assessed for nitrate and nitrite.

**Table F-33.** Summary of ERA HQs for the Experimental Field Station Area 1.

COPCs Receptors	1,3,5-trinitrobenzene HQs	1,3-dinitrobenzene HQs	2,4,6-TNT HQs	Nitrate HQs
Deer mouse	1	30	200	3
Pygmy rabbit	2	80	300	3

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Experimental Field Station Area 1 are discussed below.

- The HQs for exposure to 1,3,5-trinitrobenzene ranged from 1 for the deer mouse (M422) to 2 for the pygmy rabbit (M122A). The EPC in the surface soil is 80 mg/kg decreasing to 15.3 mg/kg in the subsurface soil. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to 1,3-dinitrobenzene ranged from 30 for the deer mouse (M422) to 80 for the pygmy rabbit (M122A). The EPC in the surface soil is 14 mg/kg decreasing to 1.01 mg/kg in the subsurface soil. This contaminant is above the low risk HQ of 10 for the deer mouse and pygmy rabbit.
- The HQs for exposure to 2,4,6-trinitrotoluene ranged from 200 for the deer mouse (M422) to 300 for the pygmy rabbit (M122A). The EPC in the surface soil is 1,100 mg/kg decreasing to 0.75 mg/kg in the subsurface soil. This contaminant is above the low risk HQ of 10 for the pygmy rabbit.
- 4-amino-2,6-dinitrotoluene HQs for Experimental Field Station Area 1 were all below 1.0.
- The only HQ  $\geq 1$  for exposure to nitrate was a 3 for the pygmy rabbit (M122A) and deer mouse (M422). The EPC in the surface soil is 406 mg/kg decreasing to 118 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Nitrite HQs at the experimental field station Area 1 were all below 1.0. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data.

The risk evaluation indicates that the Experimental Field Station Area 1 has risk to ecological receptors from exposure to 1,3-dinitrobenzene and 2,4,6-TNT.

## Area 2

HQs for the COPCs from this area ranged from 1 to 4. Risks to plants could not be assessed for threats from exposure to nitrate and nitrite.

**Table F-34.** Summary of ERA HQs for the Experimental Field Station Area 2.

COPCs Receptors	Nitrate HQs	Nitrite HQs
Deer mouse	2	—
Loggerhead shrike	1	1
Pygmy rabbit	2	—
Sage sparrow	4	1
<u>Townsend's western big-eared bat</u>	3	1

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Experimental Field Station Area 2 are discussed below.

- The HQs for exposure to nitrate ranged from 1 for the loggerhead shrike (AV322), 2 for the pygmy rabbit (M122A), and deer mouse (M422), 3 for the Townsend's western big-eared bat, to 4 for the sage sparrow (AV222). The EPC in the surface soil is 246 mg/kg decreasing to 89.3 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only HQ  $\geq 1$  for exposure to nitrite was a 1 for the sage sparrow (AV222). The EPC in the surface soil is 81.4 mg/kg decreasing to 29.6 mg/kg in the subsurface soil. The INEEL background value for nitrite has not been evaluated or made available at this time. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the Experimental Field Station has limited risk to ecological receptors from exposure to soils from this area.

In summary, based on dose and HQ calculations and background comparisons, the primary potential risk-drivers at the Experimental Field Station include 1,3-dinitrobenzene and 2,4,6-TNT (at Area 1) in soil. Complete ERA results are presented in Appendix G. The risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

### **F-3.9.34 Unexploded Ordnance East of the TRA**

The COPCs for the ecological risk assessment include several inorganics and explosive compounds for the surface and subsurface soils. Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. These HQs and COPCs are presented in Tables F-35. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no

longer need to be evaluated. HQs from the contaminants at this site ranged from 1 to 3. Risks from the COPCs to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop TRVs. Risks to birds and plants could not be assessed for threats from exposure to 2,4,6-TNT. Furthermore, risk to plants could not be assessed for nitrate and nitrite.

**Table F-35.** Summary of ERA HQs for the Unexploded Ordnance East of TRA.

COPCs Receptors	2,4,6-TNT HQs	Nitrate HQs	Nitrite HQs
Deer mouse	—	1	—
Loggerhead shrike	—	1	—
Pygmy rabbit	1	1	—
Sage sparrow	—	3	1
Townsend's western big-eared bat	—	3	—

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Unexploded Ordnance Area East of Test Reactor Area (TRA) are discussed below.

- The only  $HQ \geq 1$  for exposure to 2,4,6-trinitrotoluene was a 1 for the pygmy rabbit (M122A). The EPC in the surface soil is 4.6 mg/kg decreasing to 0.28 mg/kg in the subsurface soil. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to nitrate ranged from 1 for the loggerhead shrike (AV322), pygmy rabbit (M122A), and deer mouse (M422) to 3 for the Townsend's western big-eared bat (M210A) and sage sparrow (AV222). The EPC in the surface soil is 210 mg/kg decreasing to 73.5 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only  $HQ \geq 1$  for exposure to nitrite was a 1 for the sage sparrow (AV222). The EPC in the surface soil is 62.7 mg/kg decreasing to 20.3 mg/kg in the subsurface soil. The INEEL background value for nitrite has not been evaluated or made available at this time. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the Unexploded Ordnance East of the TRA (ORD-16) has limited risk to ecological receptors from exposure to soils from this area. Complete ERA results are presented in Appendix G. The risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

### F-3.9.35 Burn Ring South of Experimental Field Station

The COPCs for the ecological risk assessment include several inorganics, explosive compounds, TPH, pesticides and polychlorinated biphenyls for the surface and subsurface soils. The TPH, pesticides, and polychlorinated biphenyl COPCs were eliminated during the soil contaminant screening process (see Appendix C). These HQs and COPCs are presented in Table F-36. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs from the contaminants at this site ranged from 1 to 80. Risks from the COPCs to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop TRVs. Risk to plants could not be assessed for cobalt, fluoride, nitrate and nitrite. Bromomethane and trichlorofluoromethane were among these COPCs, but no toxicity information could be found to assess ecological risk. These contaminants were considered low risk because their concentrations were found at low levels. (The EPC in the surface and subsurface soil was 0.012 mg/kg for bromomethane and the EPC in the surface and subsurface soil was 0.006 mg/kg for trichlorofluoromethane.) For this reason, these COPCs were unlikely to pose significant risk to any ecological receptor and will no longer be evaluated.

**Table F-36.** Summary of ERA HQs for Burn Ring South of Experimental Field Station.

COPCs Receptors	Chromium HQs	Cobalt HQs	Copper HQs	Nitrate HQs	Zinc HQs
Deer mouse	—	—	—	—	2
Plants	7	—	—	—	80
Pygmy rabbit	—	5	3	1	20

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Burn Ring South of Experimental Field Station are discussed below.

- The only  $HQ \geq 1$  for exposure to chromium was a 7 for the plants (all vegetation). The EPC in the surface soil is 37.5 mg/kg decreasing to 15 mg/kg in the subsurface soil. The INEEL background concentration for chromium is 33 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only  $HQ \geq 1$  for exposure to cobalt was a 5 for the pygmy rabbit (M122A). The EPC in the surface soil is 11.1 mg/kg decreasing to 4.5 mg/kg in the subsurface soil. The INEEL background concentration for cobalt is 12.5 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only  $HQ \geq 1$  for exposure to copper was a 3 for the pygmy rabbit (M122A). The EPC in the surface soil is 37.1 mg/kg decreasing to 11.1 mg/kg in the subsurface soil. The INEEL background concentration for copper is 22 mg/kg. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Lead HQs at the burn ring area were all below 1.0.

- Nickel HQs at the burn ring area were all below 1.0.
- The only HQ  $\geq 1$  for exposure to nitrate was a 1 for the pygmy rabbit (M122A). The EPC in the surface soil is 310 mg/kg decreasing to 107 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Nitrite HQs at the burn ring area were all below 1.0. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data.
- The HQs for exposure to zinc ranged from 2 for the deer mouse (M422), 20 for the pygmy rabbit (M122A), to 80 for the plants (all vegetation). The EPC in the surface soil is 2,710 mg/kg decreasing to 201 mg/kg in the subsurface soil. The INEEL background concentration for zinc is 150 mg/kg. The HQ is well above the low risk HQ of 10.

The risk evaluation indicates that the burn ring has risk to ecological receptors from exposure to zinc. Complete ERA results are presented in Appendix G. The risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

#### **F-3.9.36 Igloo-Type structures Northwest of Experimental Field Station**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

#### **F-3.9.37 Rail Car Explosion Area**

In order to characterize the Rail Car Explosion Area better and because this site covers such a large area, it was divided into five separate areas. This was also done to help keep the contaminants limited to the area from which they were found. Then, if remediation was needed, it would be limited to the contaminated area, and less unnecessary habitat would be destroyed. The COPCs for the ecological risk assessment include several inorganics and explosive compounds for the surface and subsurface soils. Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. These HQs and COPCs are presented in Tables F-37 through F-40. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs from the contaminants at this site ranged from 1 to 5. Risks from these contaminants to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop TRVs. (As the contaminants are discussed in greater detail below, they may contain a few more data gaps because of the lack of toxicity data and will be discussed more quantitatively.) Also, a few of the COPCs for this site could not be assessed for ecological risk because of the lack of toxicity information. These COPCs will be discussed in greater detail under their designated area.

##### Area 2

HQs for the COPCs from this area ranged from 1 to 4. Risk to plants could not be assessed for nitrate and nitrite.

**Table F-37.** Summary of ERA HQs for the Rail Car Explosion Area 2.

COPCs Receptors	Nitrate HQs	Thallium HQs
Black-billed magpie	2	—
Deer mouse	2	—
Loggerhead shrike	3	—
Mourning dove	4	—
Pygmy rabbit	2	—
Sage sparrow	4	2
Townsend's western big-eared bat	3	3

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Rail Car Explosion Area 2 are discussed below.

- Nickel HQs at the Rail Car Explosion area were all below 1.0.
- The HQs for exposure to nitrate ranged from 2 for the black-billed magpie (AV422), pygmy rabbit (M122A), and deer mouse (M422); 3 for the Townsend's western big-eared bat (M210A), loggerhead shrike (AV322); to 4 for the sage sparrow (AV222) and mourning dove (AV122). The EPC in the surface soil is 260 mg/kg decreasing to 79.5 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Nitrite HQs at the Rail Car Explosion Area were all below 1.0. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data.
- Selenium HQs at the Rail Car Explosion Area were all below 1.0.
- The HQs for exposure to thallium ranged from 2 for the sage sparrow (AV222) to 3 for the Townsend's western big-eared bat (M210A). The EPC in the surface soil is 0.54 mg/kg decreasing to 0.27 mg/kg in the subsurface soil. The INEEL background concentration for thallium is 0.43 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the Rail Car Explosion Area 2 has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for the this area.

### Area 3

HQs for the COPCs from this area ranged from 1 to 5. Risk to plants could not be assessed for nitrate and nitrite.

**Table F-38.** Summary of ERA HQs for the Rail Car Explosion Area 3.

COPC Receptors	Nitrate HQs
Black-billed magpie	3
Burrowing owl	1
Deer mouse	2
Loggerhead shrike	4
Mourning dove	5
Pygmy rabbit	2
Sage sparrow	5
Townsend's western big-eared bat	4

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Rail Car Explosion Area 3 are discussed below.

- The HQs for exposure to nitrate ranged from 1 for the burrowing owl (AV322A), 2 for the pygmy rabbit (M122A) and deer mouse (M422), 3 for the black-billed magpie (AV422), 4 for the loggerhead shrike (AV322) and Townsend's western big-eared bat (M210A), to 5 for the mourning dove (AV122) and sage sparrow (AV222). The EPC in the surface soil is 346 mg/kg decreasing to 90.8 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Nitrite HQs at the Rail Car Explosion Area were all below 1.0. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data.

The risk evaluation indicates that the Rail Car Explosion Area 3 has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for Rail Car Explosion Area 3.

#### Area 4

HQs for the COPCs from this area were all below 1.0. Risks to birds and plants could not be assessed for threats from exposure to 2,6-dinitrotoluene. HQs for the COPCs at the Rail Car Explosion Area 4 are discussed below.

- 2,6-dinitrotoluene HQs at the Rail Car Explosion Area were all below 1.0.

The risk evaluation indicates that the Rail Car Explosion Area 4 has limited risk to ecological receptors from exposure to soils from this area. Risk from 2,6-dinitrotoluene could not be evaluated for several receptor groups, but the detection frequency was only 0.17, and it is unlikely to present a widespread exposure hazard. No COPCs were retained for further evaluation in the ERA for Rail Car Explosion Area 4.



### Area 5

HQs for the COPCs from this area ranged from 1 to 3. Risk to plants could not be assessed for nitrate and nitrite.

**Table F-39.** Summary of ERA HQs for the Rail Car Explosion Area 5.

COPC Receptors	Nitrate HQs
Black-billed magpie	2
Deer mouse	1
Loggerhead shrike	3
Mourning dove	3
Pygmy rabbit	1
Sage sparrow	3
<u>Townsend's western big-eared bat</u>	3

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Rail Car Explosion Area 5 are discussed below.

- The HQs for exposure to nitrate ranged from 1 for the pygmy rabbit (M122A) and deer mouse (M422), 2 for the black-billed magpie (AV422), to 3 for the loggerhead shrike (AV322), Townsend's western big-eared bat (M210A), mourning dove (AV122) and sage sparrow (AV222). The EPC in the surface soil is 206 mg/kg decreasing to 73.3 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Nitrite HQs at the Rail Car Explosion Area were all below 1.0. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data.

The risk evaluation indicates that the Rail Car Explosion Area 5 has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for Rail Car Explosion Area 5.

### Area 6

HQs for the COPCs from this area ranged from 1 to 4. Risk to plants could not be assessed for nitrate and nitrite.

Table F-40. Summary of ERA HQs for the Rail Car Explosion Area 6.

COPCs Receptors	Nitrate HQs	Nitrite HQs
Black-billed magpie	2	—
Deer mouse	2	—
Loggerhead shrike	3	1
Mourning dove	4	1
Pygmy rabbit	2	—
Sage sparrow	4	2
Townsend's western big-eared bat	3	1

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Rail Car Explosion Area 6 are discussed below.

- The HQs for exposure to nitrate ranged from 2 for the pygmy rabbit (M122A), deer mouse (M422) and black-billed magpie (AV422); 3 for the loggerhead shrike (AV322) and Townsend's western big-eared bat (M210A); to 4 for the mourning dove (AV122) and sage sparrow (AV222). The EPC in the surface soil is 260 mg/kg decreasing to 76 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to nitrite ranged from 1 for the mourning dove (AV122), loggerhead shrike (AV322), and the Townsend's western big-eared bat (M210A) to 2 for the sage sparrow (AV222). The EPC in the surface soil is 110 mg/kg decreasing to 96 mg/kg in the subsurface soil. The INEEL background value for sulfate has not been evaluated or made available at this time. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data. This contaminant was eliminated as a COPC because the HQs were equal to or below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the Rail Car Explosion Area 6 has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for Rail Car Explosion Area 6.

In summary, based on dose and HQ calculations and background comparisons, there are no potential risk-drivers at the Rail Car Explosion Area. Complete ERA results are presented in Appendix G. The risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

### F-3.9.38 Unexploded Projectiles East of ARVFS

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

### **F-3.9.39 Juniper Mine**

The COPCs at this site are unexploded ordnance buried deep within the subsurface soil (below 10 ft). Because of the depth of the contaminants, there is no pathway to ecological receptors and the risk to these ecological receptors is considered low. See Table 21-1.

### **F-3.9.40 Projectiles Found Near Mile Marker 17, 18, and 19**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

### **F-3.9.41 Rifle Range**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

### **F-3.9.42 Land Mine and Fuze Burn Area**

In order to characterize the Land Mine and Fuze Area better and because this site covers such a large area, it was divided into two separate areas. This was also done to help keep the contaminants limited to the area from which they were found. Then, if remediation was needed, it would be limited to the contaminated area and less unnecessary habitat would be destroyed. The COPCs for the ecological risk assessment include several inorganics and explosive compounds for the surface and subsurface soils. Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. These HQs and COPCs are presented in Tables F-41 and F-42. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs from the contaminants at this site ranged from 1 to 10,000. Risks from these contaminants to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop TRVs. (As the contaminants are discussed in greater detail below, they may contain a few more data gaps because of the lack of toxicity data and will be discussed more quantitatively.) Also, a few of the COPCs for this site could not be assessed for ecological risk because of the lack of toxicity information. These COPCs will be discussed in greater detail under their designated area.

#### Area 2

HQs for the COPCs from this area ranged from 1 to 3. Risks to birds and plants could not be assessed for threats from exposure to 2,4,6-TNT and 2,6-dinitrotoluene. Furthermore, risk to plants could not be assessed for nitrate.

**Table F-41.** Summary of ERA HQs for the Land Mine and Fuze Burn Area 2.

COPCs Receptors	Lead HQs	Nitrate HQs	Selenium HQs
Black-billed magpie	—	1	—
Deer mouse	—	1	—
Loggerhead shrike	2	2	—
Mourning dove	—	3	—
Pygmy rabbit	—	1	—
Sage sparrow	1	3	2
Townsend's western big-eared bat	—	2	1

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Land Mine and Fuze Burn Area 2 are discussed below.

- 2,4,6-trinitrotoluene HQs at the Land Mine and Fuze Burn Area 2 were all below 1.0.
- 2,6-dinitrotoluene HQs at the Land Mine and Fuze Burn Area 2 were all below 1.0.
- The HQs for exposure to lead ranged from 1 for the sage sparrow (AV222) to 2 for the loggerhead shrike (AV322). The EPC in the surface soil is 13.8 mg/kg decreasing to 6.4 mg/kg in the subsurface soil. The INEEL UTL background concentration for lead is 17 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQ fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to nitrate ranged from 1 for black-billed magpie (AV422), pygmy rabbit (M122A), and deer mouse (M422); 2 for the loggerhead shrike (AV322) and Townsend's western big-eared bat (M210A); to 3 for the mourning dove (AV122) and sage sparrow (AV222). The EPC in the surface soil is 190 mg/kg decreasing to 85.1 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to selenium ranged from 1 for the Townsend's western big-eared bat (M210A) to 2 for the sage sparrow (AV222). The EPC in the surface soil is 0.9 mg/kg decreasing to 0.62 mg/kg in the subsurface soil. The INEEL UTL background concentration for selenium is 0.22 mg/kg. This contaminant was eliminated as a COPC because the HQ fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the Land Mine and Fuze Burn Area 2 has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for this area.

### Area 3

HQs for the COPCs from this area ranged from 1 to 10,000. Risks to birds and plants could not be assessed for threats from exposure to 1,3-dinitrobenzene, 2,4-dinitrotoluene, 2,4,6-TNT, and TPH. Furthermore, risk to plants could not be assessed for nitrate.

**Table F-42.** Summary of ERA HQs for the Land Mine and Fuze Burn Area 3.

COPCs Receptors	1,3-Dinitrobenzene	2,4-Dinitrotoluene	2,4,6-TNT HQs	Nitrate HQs	TPH-diesel HQs	Zinc HQs
Deer mouse	200 <sup>a</sup>	10	900	—	—	—
Plants			—	—	—	10
Pygmy rabbit	4,000 <sup>a</sup>	2000 <sup>a</sup>	10,000	5	5	3

COPCs with HQs less than one are not presented in this table.

a. See the bulleted discussion on 1,3-dinitrobenzene and 2,4-dinitrotoluene following this table as to why these HQs are not retained in the ERA.

The HQs for the COPCs at the Land Mine and Fuze Burn Area 3 are discussed below.

- The HQs for exposure to 1,3-dinitrobenzene ranged from 200 for the deer mouse (M422) to 4,000 for the pygmy rabbit (M122A). The EPC in the surface soil is 1,300 mg/kg decreasing to 89.5 mg/kg in the subsurface soil. This contaminant is well above the low risk HQ of 10 for the deer mouse and pygmy rabbit. However, the EPC value was based on a sample concentration that was considered a nondetect by the lab and the Sample Management Office (SMO). This maximum detected concentration was left in this site's data set because of the uncertainties associated with maximum detection limit. If the risk assessment was performed using the actual maximum detected concentration of 1,3-dinitrobenzene than this COPC would only present a HQ of 1 for the pygmy rabbit. This COPC cannot be evaluated as a risk driver, because of the uncertainties associated with sampling results.
- The HQs for exposure to 2,4-dinitrotoluene ranged from 10 for the deer mouse (M422) to 200 for the pygmy rabbit (M122A). The EPC in the surface soil is 1,300 mg/kg decreasing to 89.5 mg/kg in the subsurface soil. This contaminant is well above the low risk HW of 10 for the pygmy rabbit. However, the EPC value was based on a sample concentration that was considered a nondetect by the lab and the SMO. This maximum detected concentration was left in this site's data set because of the uncertainties associated with maximum detection limit. If the risk assessment was performed using the actual maximum detected concentration of 2,4-dinitrotoluene than this COPC would only present a HQ of 1 for the pygmy rabbit. This COPC cannot be evaluated as a risk driver, because of the uncertainties associated with sampling results.
- The HQs for exposure to 2,4,6-trinitrotoluene ranged from 900 for the deer mouse (M422) to 10,000 for the pygmy rabbit (M122A). The EPC in the surface soil is 69,000 mg/kg decreasing to 4,010 mg/kg in the subsurface soil. This contaminant is well above the low risk HQ of 10 for both species.
- The only HQ  $\geq 1$  for exposure to nitrate was a 5 for the pygmy rabbit (M122A). The EPC in the surface soil is 1,600 mg/kg decreasing to 206 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This

contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

- The only  $HQ \geq 1$  for the exposure to TPH-diesel was a 5 for the pygmy rabbit (M122A). The EPC in the surface soil is 151 mg/kg decreasing to 7.75 mg/kg in the subsurface soil. TRV values from benzene were used to evaluate this contaminant because benzene is the most hazardous chemical found in TPH-diesel. This was done because TRV values for TPH-diesel could not be developed because of the lack of toxicity data. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to zinc ranged from 3 for the pygmy rabbit (M122A) to 10 for the plants (all vegetation). The EPC in the surface soil is 446 mg/kg decreasing to 54.6 mg/kg in the subsurface soil. The INEEL background concentration for zinc is 150 mg/kg. This contaminant was eliminated as a COPC because the HQs were equal to or fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the Land Mine and Fuze Burn Area 3 has risk to ecological receptors from exposure to 2,4,6-TNT and some potential for risk to 1,3-dinitrobenzene and 2,4-dinitrotoluene..

In summary, based on dose and HQ calculations and background comparisons, the primary potential risk-drivers at the Land Mine and Fuze Burn Area 2,4,6-TNT, in soil. Complete ERA results are presented in Appendix G. The risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

#### **F-3.9.43 Ordnance and Dry Explosives East of the Big Lost River and North of the NRF**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

#### **F-3.9.44 Zone East of the Big Lost River**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

#### **F-3.9.45 Dirt Mounds Near the Experimental Field Stations, NOAA, and NRF**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

#### **F-3.9.46 Craters East of INTEC**

The COPCs for the ecological risk assessment include several inorganics and explosive compounds for the surface and subsurface soils. Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. These HQs and COPCs are presented in Table F-43. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs from the contaminants at this site ranged from 1 to 4. Risks from the COPCs to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop TRVs. Risk to plants could not be assessed for nitrate and nitrite.

**Table F-43.** Summary of ERA HQs for the Craters East of INTEC.

COPCs Receptors	Nitrate HQs	Nitrite HQs	Selenium HQs
Black-billed magpie	1	—	—
Deer mouse	2	—	—
Loggerhead shrike	3	—	—
Mourning dove	3	—	—
Pygmy rabbit	2	—	—
Sage sparrow	4	1	2
Townsend's western big-eared bat	3	1	2

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Crater East of INTEC are discussed below.

- The HQs for exposure to nitrate ranged from 1 for the black-billed magpie (AV422); 2 for the pygmy rabbit (M122A), deer mouse (M422), and mourning dove (AV122); 3 for the loggerhead shrike (AV322) and Townsend's western big-eared bat (M210A); to 4 for the sage sparrow (AV222). The EPC in the surface soil is 260 mg/kg decreasing to 104 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only  $HQ \geq 1$  for exposure to nitrite was a 1 for the sage sparrow (AV222) and Townsend's western big-eared bat (M210A). The EPC in the surface soil is 76.8 mg/kg decreasing to 31.5 mg/kg in the subsurface soil. The INEEL background value for nitrite has not been evaluated or made available at this time. TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only  $HQ \geq 1$  for exposure to selenium was a 2 for the Townsend's western big-eared bat (M210A) and sage sparrow (AV222). The EPC in the surface soil is 0.9 mg/kg decreasing to 0.34 mg/kg in the subsurface soil. The INEEL background concentration for selenium is 0.22 mg/kg. This contaminant was eliminated as a COPC because the HQ fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the Craters East of INTEC has limited risk to ecological receptors from exposure to soils from this site. Complete ERA results are presented in Appendix G. The risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

#### **F-3.9.47 Big Southern Butte**

There is no evident soil contamination at this site, and the risk from unexploded ordnance to ecological receptors is considered low. See Table 21-1.

### F-3.9.48 STF-02 (STF Gun Range Berm)

In order to characterize the STF Gun Range Berm area better, it was divided into two separate areas (kickout and remainder area). This was also done to help keep the contaminants limited to the area from which they were found. Then, if remediation was needed, it would be limited to the contaminated area and less unnecessary habitat would be destroyed. The COPCs for the ecological risk assessment include copper, lead, and creosote for the surface and subsurface soils. Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. These HQs and COPCs are presented in Tables F-44 and F-45. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs from the contaminants at this site ranged from 1 to 2,000. Risks from these contaminants to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop TRVs. (As the contaminants are discussed in greater detail below, they may contain a few more data gaps because of the lack of toxicity data and will be discussed more quantitatively.) Also, a few of the COPCs for this site could not be assessed for ecological risk because of the lack of toxicity information. These COPCs will be discussed in greater detail under their designated area.

#### Area 1 (remainder area)

HQs for the COPCs from this area ranged from 1 to 2,000. Risks to birds could not be assessed for threats from exposure to antimony.

**Table F-44.** Summary of ERA HQs for the STF-02 Remainder Area.

COPCs Receptors	Antimony HQs	Copper HQs	Lead HQs	Zinc HQs
Black-billed magpie	—	—	<b>100</b>	—
Burrowing owl	—	—	<b>200</b>	—
Deer mouse	2	10	<b>300</b>	1
Ferruginous hawk	—	—	2	—
Loggerhead shrike	—	—	<b>900</b>	1
Mourning dove	—	—	<b>20</b>	1
Plants	—	—	10	3
Pygmy rabbit	—	7	<b>20</b>	1
Sage sparrow	—	2	<b>2,000</b>	8
Townsend's western big-eared bat	4	10	<b>300</b>	—

COPCs with HQs less than one are not presented in this table.



The HQs for the COPCs at the STF Gun Range Berm Area 1 are discussed below.

- The HQs for exposure to antimony ranged from 2 for the deer mouse (M422) to 4 for the Townsend's western big-eared bat (M210A). The EPC in the surface soil is 14.9 mg/kg decreasing to 1.13 mg/kg in the subsurface soil. The INEEL background concentration for antimony is 4.8 mg/kg. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to copper ranged from 2 for the sage sparrow (AV222), 7 for the pygmy rabbit (M122A), to 10 for the deer mouse (M422) and Townsend's western big-eared bat (M210A). The EPC in the surface soil is 54.2 mg/kg decreasing to 9.4 mg/kg in the subsurface soil. The INEEL background concentration for copper is 22 mg/kg. This contaminant was eliminated as a COPC because the HQs were equal to or fell below 10, which indicates a low risk to ecological receptors. Two sample results for copper were removed from the data set before the EPCs were calculated. These samples were removed because they were representative of "hot spots." These two sample results have concentrations of 1,230 and 271 mg/kg. The next highest concentration for copper was 185 mg/kg. These elevated sample results are most likely from the casings of the small ammunitions used in this area. These "hot spot" sample results were removed so that they wouldn't be averaged over the whole area, creating an unrealistic risk. Therefore, risk from exposure to copper contamination at STF-02 is not considered significant.
- The HQs for exposure to lead ranged from 2 for the ferruginous hawk (AV322), 10 for plants (all vegetation), 20 for the mourning dove (AV122) and pygmy rabbit (M122A), 100 for the black-billed magpie (AV422), 200 for the burrowing owl (AV322A), 300 for the deer mouse (422) and Townsend's western big-eared bat (M210A), 900 for the loggerhead shrike (AV322), to 2,000 for the sage sparrow (AV222). The EPC in the surface soil is 24,400 mg/kg decreasing to 1,670 mg/kg in the subsurface soil. The INEEL background concentration for lead is 17 mg/kg. The HQs for this contaminant are well above the low risk HQ of 10.
- Selenium HQs at the STF Gun Range Berm Area 1 were all below 1.0.
- The HQs for exposure to zinc ranged from 1 for the loggerhead shrike (AV322), deer mouse (M422), pygmy rabbit (M122A) and mourning dove (AV122); 3 for the plants (all vegetation); to 8 for the sage sparrow (AV222). The EPC in the surface soil is 109 mg/kg decreasing to 26.7 mg/kg in the subsurface soil. The INEEL background concentration for zinc is 150 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the STF Gun Range Berm Area 1 (STF-02) has risk to ecological receptors from exposure to copper and lead.

#### Area 2 (kickout area)

HQs for the COPCs from this area ranged from 1 to 6. The only COPC with an HQ less than 1 was selenium.

**Table F-45.** Summary of ERA HQs for the STF-02 Kickout Area.

COPCs Receptors	Copper HQs	Lead HQs	Manganese HQs
Deer mouse	5	—	9
Loggerhead shrike	—	2	—
Mourning dove	—	—	2
Mule deer	—	—	1
Plants	—	—	9
Pygmy rabbit	3	—	20 <sup>a</sup>
Sage sparrow	—	2	—
Townsend's western big-eared bat	6	—	—

COPCs with HQs less than one are not presented in this table.

a. See the discussion for manganese in the bulleted section below as to why this HQ is not in bold.

The HQs for the COPCs at the STF Gun Range Berm Area 2 are discussed below.

- The HQs for exposure to copper ranged from 3 for the pygmy rabbit (M122A), 5 for the deer mouse (M422) to 6 for the Townsend's western big-eared bat (M210A). The EPC in the surface soil is 21.1 mg/kg decreasing to 1.05 mg/kg in the subsurface soil. The INEEL UTL background concentration for copper is 22 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only HQ  $\geq 1$  for exposure to lead was a 2 for the loggerhead shrike (AV322) and sage sparrow (AV222). The EPC in the surface soil is 26.7 mg/kg decreasing to 1.3 mg/kg in the subsurface soil. The INEEL background concentration for lead is 17 mg/kg. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to manganese were 1 for the mule deer (M122), 2 for the mourning dove (AV122), 9 for the deer mouse (M422) and plants (all vegetation), to 20 for the pygmy rabbit (M122A). The EPC in the surface soil is 474 mg/kg, decreasing to 23.7 mg/kg in the subsurface soil. The INEEL background for manganese is 490 mg/kg. Therefore, a receptor maybe exposed to the same magnitude of risk from exposure to background. The only receptor with an HQ greater than 10 from exposure to this contaminant was the pygmy rabbit. The EPC for this contaminant represents an overly conservative value due to exposure modeling using weighted averages and, therefore, may result in overestimated risk to ecological receptors. Therefore, risk from exposure to manganese contamination is not considered significant and will no longer be evaluated.
- Selenium HQs at the STF Gun Range Berm Area 2 were all below 1.0.

The risk evaluation indicates that the STF Gun Range Berm Area 2 (STF-02) has limited risk to ecological receptors from exposure to soil at this site.

The overall risk evaluation indicates that the STF Gun Range Berm has risk to ecological receptors from exposure to lead (at Area 1). Complete ERA results can be found in Appendix G.

### **F-3.10 Discussion of Uncertainty**

Uncertainty is inherent in the risk process and has been discussed in detail throughout this document. Principal sources of uncertainty lie within the use of data not specifically collected for the ecological risk assessment and in the development of the exposure assessment. Uncertainties inherent in the exposure assessment are associated with estimation of receptor ingestion rates, selection of acceptable HQs, estimation of site usage, and estimation of PUFs and BAFs. Additional uncertainties are associated with the depiction of site characteristics, the determination of the nature and extent of contamination, and the derivation of TRVs. A large area of uncertainty is the inability to evaluate risk to many receptors because of the lack of appropriate toxicity data for many chemicals. This is especially a problem for certain receptors such as reptiles. The species for which TRVs could not be developed for COPCs are identified in Table F-10. In addition, because of the conservative nature of the EBSL development, EBSLs for some chemicals are lower than their sample quantitation and detection limits. All of these uncertainties likely influence risk estimates. The major sources and effects of uncertainties in the ERA are reviewed in Table F-46???.

#### **F-3.10.1 Waste Area Groups 6 and 10 Ecological Risk Assessment Summary**

The objectives of this assessment were to define the extent of contamination for each site at the WAG level; determine the potential effects from contaminants on environmental receptors, habitats, or special environments; determine the potential effects from contaminants to other ecological receptors at WAGs 6 and 10; and identify sites and COPCs to be assessed in the OU 10-04 ERA. The approach is an extension of the screening-level ecological risk assessment (SLERA) methodology used at the INEEL (VanHorn et al. 1995). This methodology uses conservative exposure modeling and input parameters to identify contaminants and sites that may pose a risk to the environment.

A summary of the WAG 6 and 10 ERA results for all sites is provided in Table F-47???. The sites that were retained for further evaluation or were eliminated from further evaluation in the WAG 6 and 10 ERA throughout the various phases of the assessment are summarized in Table F-6. Of the 68 sites at WAGs 6 and 10, 47 sites were originally retained for analysis in the WAG 6 and 10 ERA. These are BORAX-01, BORAX-02, BORAX-08, BORAX-09, CPP-66, EBR-01, EBR-03, EBR-04, EBR-08, EBR-09, EBR-10, EBR-11, EBR-12, EBR-15, EOGR-03, LCCDA-01, LCCDA-02, OMRE-01, OU 10-03 Ordnance Areas, and STF-02. The initial screening compared contaminant exposure-point concentrations to INEEL-wide background concentrations for inorganics and certain radionuclides, and to minimum EBSLs. This screening step eliminated radionuclides as COPCs at all sites, and BORAX-02, BORAX-08, several ordnance sites, and all the EBR sites except for EBR-01 were completely eliminated from further assessment.

The remaining sites (BORAX-01, BORAX-09, CPP-66 [Fly ash pit], LCCDA-01, LCCDA-02, NODA, NOAA, OMRE-01, Fire Station Zone and Range Fire Burn Area, CFA-633 Naval Firing Site and Downrange Area, Experimental Field Station, MDA, Unexploded Ordnance East of TRA, Burn Ring South of Experimental Field Station, Rail Car Explosion Area, Land Mine and Fuze Burn Area, and Craters East of INTEC, and STF-02) were evaluated in the subsequent phases of the WAG 6 and 10 ERA.

**Table F-46.** Source and effects of uncertainties in the ecological risk assessment.

Uncertainty factor	Effect of uncertainty (level of magnitude)	Comments
Estimation of ingestion rates (soil, water, and food)	May result in an overestimate or underestimate of risk (moderate).	Few intake (ingestion estimates used for terrestrial receptors are based on data in the scientific literature [preferably site-specific]) when available. Food ingestion rates are calculated by using allometric equations available in the literature (Nagy 1987). Soil ingestion values are generally taken from Beyer et al. (1994).
Estimation of concentration factors and plant uptake factors	May result in an overestimate or underestimate of risk, and the magnitude of error cannot be quantified (high).	Few BAFs or PUFs are available in the literature because they must be both contaminant and receptor specific. In the absence of more specific information, PUFs and BAFs are obtained from Baes et al. (1984) for metals and elements and from Travis and Arms (1988) for organics.
Estimation of toxicity reference values	May result in an overestimate (high) or underestimate (moderate) of risk.	To compensate for potential uncertainties in the exposure assessment, various adjustment factors are incorporated to extrapolate toxicity from the test organism to other species.
Conservative TRVs may exceed background concentrations for inorganics	May result in an overestimate (high) of risk.	The nature of the TRVs results in risk being shown at INEEL background concentrations for metals. This can result in an erroneous indication of risk to certain receptors.
Lack of appropriate toxicity data to derive TRVs	Results in the inability to evaluate risk for many receptors and chemicals.	Those receptor groups and chemicals that could not be evaluated are data gaps in the assessment.
Use of selected species	May result in an underestimate (moderate) of risk.	The individual species selected based on multiple criteria may not be the most sensitive. For example, species-specific responses to different contaminants may possibly occur. (i.e., chocolate is toxic to domestic dogs) that would ultimately be overlooked in this type of analysis.
Site use factor	May result in an overestimate (high) or underestimate (low) of risk.	The SUF is a percentage of the site of concern area compared to the home range of the receptor species. When the home range is not known for a species, a default value of 1.0 is used. This can result in an overestimate of the risk at small sites.

**Table F-47.** Summary of the sites with potential for posing risk to ecological receptors.

Site Description and Size (m <sup>2</sup> )	Contaminant of Potential Concern	Exposure Point Concentration (EPC) mg/kg	Hazard Quotient <sup>a</sup>
Burn Ring South of Experimental Field Station (13.39 m <sup>2</sup> )	Zinc <sup>a</sup>	2.71 E+03	≤ 1 to ≤ 80
CFA-633 Naval Firing Site and Downrange Area (5,952 m <sup>2</sup> )	RDX <sup>b</sup>	1.89 E+01	≤ 1 to ≤ 70
Experimental Field Station, Area 1(376 m <sup>2</sup> )	1,3-Dinitrobenzene	1.40 E+01	≤ 1 to ≤ 80
	2,4,6-Trinitrotoluene	1.10 E+03	≤ 1 to ≤ 300
Fire Station II Zone and Range Fire Burn Area, Area 1 (14,840 m <sup>2</sup> )	2,4,6-Trinitrotoluene	6.20 E+01	≤ 1 to ≤ 20
Area 2 (14,916 m <sup>2</sup> )	RDX	3.70 E+00	≤ 1 to ≤ 40
Area 4 (364 m <sup>2</sup> )	2,4,6-Trinitrotoluene	1.30 E+02	≤ 1 to ≤ 40
Land Mine and Fuze Burn Area, Area 3 (12.7 m <sup>2</sup> )	1,3-Dinitrobenzene <sup>c</sup>	1.30 E+03	≤ 1 to ≤ 4,000
	2,4,6-Trinitrotoluene	6.90 E+04	≤ 1 to ≤ 10,000
	2,4-Dinitrotoluene <sup>d</sup>	1.30 E+03	≤ 1 to ≤ 200
National Oceanic and Atmospheric Administration (NOAA) Grid, Area 2a (6,396 m <sup>2</sup> )	2,4,6-Trinitrotoluene	8.64 E+02	≤ 1 to ≤ 200
Area 3 (19,189 m <sup>2</sup> )	2,4,6-Trinitrotoluene	4.01 E+02	≤ 1 to ≤ 100
	RDX	1.78 E+00	≤ 1 to ≤ 20
Area 5 ( 2,564 m <sup>2</sup> )	2,4,6-Trinitrotoluene	1.900 E+03	≤ 1 to ≤ 500
Area 6 (2,209 m <sup>2</sup> )	1,3-Dinitrobenzene	2.7 E+01	≤ 1 to ≤ 200
	2,4,6-Trinitrotoluene	4.80 E+02	≤ 1 to ≤ 100
Naval Ordnance Disposal Area (NODA) Area 2 (1595 m <sup>2</sup> )	Copper <sup>e</sup>	5.68 E+02	≤ 1 to ≤ 30
	RDX	3.28 E+02	≤ 1 to ≤ 4,000
Area 4 (134 m <sup>2</sup> )	TPH-diesel <sup>f</sup>	1.20 E+03	≤ 1 to ≤ 80
Security Training Facility Gun Range Berm STF-02, remainder area (13,112 m <sup>2</sup> )	Lead	2.44 E+04	≤ 1 to ≤ 2,000

Site Description and Size (m <sup>2</sup> )	Contaminant of Potential Concern	Exposure Point Concentration (EPC) mg/kg	Hazard Quotient <sup>a</sup>
<p>a. Only two ecological receptors show risk from zinc with HQs above 10, these include plants and the pygmy rabbit. Zinc is the only COPC, at this site, presenting any potential for risk. Zinc is found naturally in the environment and is present in all foods (ATSDR 1988). Zinc is likely to be strongly sorbed to soil., and relatively little land disposed zinc is expected to be in a soluble form (DOE-ID 1999). This contaminant is unlikely to pose an unacceptable risk to ecological receptors and should not be considered a risk driver at this site. Zinc will no longer be evaluated in this ERA. However, because there is still some potential for risk, this COPC will be retained and evaluated in the OU 10-04 ERA (Section 17).</p>			
<p>b. The risk evaluation indicates that the CFA-633 Naval Firing Site and Downrange Area shows some potential for risk to ecological receptors from RDX. However, during sampling it was discovered that detected amounts of RDX were localized in smaller soil clusters, and that it is unlikely to present a widespread exposure hazard. The modeling weighted averages would have overestimated the risks for RDX. CFA-633 is highly disturbed area and does not provide desirable habitat. RDX is the only COPC at this site presenting any potential for risk. This contaminant is unlikely to pose an unacceptable risk to ecological receptors and should not be considered a risk driver at this site. This COPCs will no longer be evaluated in this ERA. However, because there is some potential for risk from exposure to RDX this COPC will be retained for further evaluation in the OU 10-04 ERA (Section 17).</p>			
<p>c. 1,3-dinitrobenzene was eliminated as a risk driver at the Land Mine and Fuze Burn Area because of uncertainty associated with the lab analysis. The exposure point concentration used in the ERA was based on a sample result that was considered a nondetect by the lab and by validation efforts. The high, non-detected concentrations were left in this site's data set because of the uncertainties associated with the maximum detection limit. These uncertainties limit the ability for determining risk to ecological receptors. The Land Mine and Fuze Burn Area is currently being evaluated for remediation from 2,4,6-TNT contamination, and presumably this COPC will be removed as well. Post-remedial sampling will include analyzing for 1,3-dinitrobenzene to determine if any residual contamination is left behind. This COPC is also being retained for the OU 10-04 ERA (Section 17).</p>			
<p>d. 2,4-dinitrotoluene was eliminated as a risk driver at the Land Mine and Fuze Burn Area because of uncertainty associated with the lab analysis. The exposure point concentration used in the ERA was based on a sample result that was considered a nondetect by the lab and by validation efforts. The high, non-detected concentrations were left in this site's data set because of the uncertainties associated with the maximum detection limit. These uncertainties limit the ability for determining risk to ecological receptors. The Land Mine and Fuze Burn Area is currently being evaluated for remediation for 2,4,6-TNT contamination, and presumably this COPC will be removed as well. Post-remedial sampling will include analyzing for 1,3-dinitrobenzene to determine if any residual contamination is left behind. This COPC is also being retained for the OU 10-04 ERA (Section 17).</p>			
<p>e. Four sample results for copper were removed from the data set before the EPCs were calculated. These samples were removed because they were representative of "hot spots." These four sample results have concentrations ranging from 24,000 to 772 mg/kg. Several other sample results showed levels above background, but they were significantly less in concentration. Therefore, risk from exposure to copper contamination at NODA Area 2 is not considered hazardous to ecological receptors. This COPCs will no longer be retained or evaluated in the FS. However, because there is some potential for risk from exposure to copper this COPC will be retained for further evaluation in the OU 10-04 ERA (Section 17).</p>			
<p>f. Only two ecological receptors show risk from TPH-diesel with HQs above 10, these include the deer mouse and the pygmy rabbit. TPH-diesel is the only COPC, at this site, presenting any potential for risk. This contaminant is unlikely to pose an unacceptable risk to ecological receptors and should not be considered a risk driver at this site. TPH-diesel will no longer be evaluated in this ERA. However, because there is still some potential for risk, this COPC will be retained and evaluated in the OU 10-04 ERA (Section 17).</p>			

The COPCs in surface and subsurface soil included several metals, explosive, and inorganic compounds at these WAG 6 and 10 sites. Receptor dose predictions and HQ calculations were completed for these remaining sites and contaminants (see Appendix G). The HQ evaluation indicates that exposure to contaminants in soil at BORAX-01, BORAX-09, CPP-66 (Fly ash pit), LCCDA-01, LCCDA-02, MDA, OMRE-01, Unexploded Ordnance East of TRA, and Rail Car Explosion Area do not result in HQs greater than 10 to ecological receptors at WAG 6 and 10. At CFA-633 Naval Firing Site and Downrange Area potential risks exist to ecological receptors from exposure to RDX in soil. The potential risk-drivers at NODA include copper, RDX, and TPH-diesel. Potential risk drivers at NOAA include 2,4,6-TNT, RDX, and 1,3-dinitrobenzene in surface soil. Potential risk drivers at Fire Station II and Range Fire Burn Area include 2,4,6-TNT and RDX in surface soil. Potential risk drivers at Experimental Field Station include 2,4,6-TNT and 1,3-dinitrobenzene in surface soil. The potential risk driver at Land Mine and Fuze Burn Area is 2,4,6-TNT in surface soil. Finally, the potential risk driver at STF-02 is lead in surface and subsurface soil.

The WAG 6 and 10 ERA provides a means to identify those contaminants that have the potential for causing adverse effects to ecological receptors (i.e., potential risk-drivers). Actual risks to ecological receptors from exposure to COPCs in soil at WAGs 6 and 10 cannot be determined without additional site-specific investigations such as bioaccumulation studies and analyses of fate and transport to determine bioavailability and toxicity of contaminants to ecological receptor organisms. It also is important to recognize that many other factors besides chemical contamination are likely impacting ecological receptors at WAGs 6 and 10. These factors include habitat degradation caused by human activity and development, and the availability of other suitable (and presumably uncontaminated) habitat in proximity to impacted areas. Factors such as these can affect ecological receptors both adversely and favorably. The effects of such physical impacts are not accounted for in the WAG 6 and 10 ERA.

The WAGs 6 and 10 ERA incorporates levels of uncertainty that could either overestimate or underestimate the actual risk to these receptors. To compensate for potential uncertainties, the WAGs 6 and 10 ERA incorporates various conservative assumptions and AFs that are designed to be conservative rather than result in a conclusion of no indication of risk when risk may exist. Regardless of the inclusion of AFs, other uncertainties exist that could affect the estimation of risk associated with WAGs 6 & 10.

For example, the basis of the TRVs developed for nonradionuclides is the effect to the individual. This conservative approach is very commonly used because of the large uncertainty inherent in extrapolating effects data from test to field organisms (multiple receptors). Exposure modeling (i.e., transport of contaminants in the food chain from the subsurface to surface) is simplistically modeled because of the lack of site-specific data. However, it is important to remember individual ecological receptors are currently present at the site and have greater exposures than most receptors in human health scenarios.

The results of this assessment will be used in the development of the OU 10-04 comprehensive RI/FS for performing the baseline ERA. As part of the OU 10-04 ERA, it is expected that TRV values will be reviewed, less conservative modeling approaches will be evaluated, and a population and community assessment methodology will be developed. The results of the WAG ERAs will be summarized and used to direct future sampling to support the OU 10-04 ERA effort, as well as to evaluate overall risk to INEEL ecological receptors.

At this time, sampling data gaps at WAGs 6 and 10 are known that would prevent the results from being rolled up into the OU 10-04 ERA. The results of the assessment at this phase will be used to identify data gaps at the INEEL-wide level.

The primary value of the WAGs 6 and 10 ERA is to provide input into the OU 10-04 ERA. To address cleanup decisions being made at the WAG level, an effort has been made to include less conservative values to allow more realistic assessment at the WAG level. It is recognized, however, that finalizing the WAG ERAs prior to the OU 10-04 comprehensive RI/FS may result in possible review of previous decisions. The risk of this occurring is unlikely given the extent and nature of the contamination at the INEEL. However, monitoring of ecological resources should be included in any decision, and these results should be reviewed at the appropriate time.

## **F-4. TRANSITION TO THE INEEL-WIDE ECOLOGICAL RISK ASSESSMENT**

The WAGs 6 and 10 ERA represents the second phase of the four-phased approach to ERA proposed in Figure F-1. The first phase is the SLERA or site data gap analysis, which is a “preassessment” performed at the WAG level. The preassessment is performed to reduce the number of sites and contaminants to be addressed in subsequent assessments and is used to (a) better define the extent and nature of individual WAG sites of contamination and identify sites where no COPCs are found, (b) reduce the number of COPCs to be addressed in the WAG ERA by eliminating those that clearly pose a low likelihood for risk, (c) identify sites for which further data are needed, and (d) identify other data gaps. Screening-level risk assessments also serve to support problem formulation and drive media and pathways to be evaluated for WAG ERAs. Because the risk assessment tasks based on the Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991) are ongoing and additional sites may be identified, the approach is also used to screen new sampling data and additional sites. The results of this phase play no role in setting remedial action levels. Details of SLERA methodology can be found in the INEEL ERA guidance manual (VanHorn et al. 1995).

In the second phase, the results of the first phase screening are subjected to an additional COPC screening to finalize sites and contaminants for the WAG ERA. Potential risks to ecological receptors are evaluated at the WAG level using an approach that parallels the human health risk assessment methodology. The WAG ERA applies aspects of the methodologies developed for the SLERA and provides a site-by-site assessment of those contaminants that were not eliminated from further evaluation in the preliminary screening process. It is the next level of screening that primarily provides input to the OU 10-04 ERA.

The WAG ERA represents the assessment of the “no action” alternative for remediation at the WAG level. The WAG ERA results (a) provided a list of COPCs to be addressed for the OU 10-04 ERA and (b) identified WAG level data gaps that must be addressed before performing the INEEL-wide ERA. The results of the WAG ERA and associated data gaps will be evaluated and discussed in more detail in the INEEL-wide RI/FS. The results of the WAG ERA also may support risk assessments to evaluate WAG remedial actions or additional assessments if necessary.

The third phase of the ERA process is the OU-10-04 ERA, which is performed to integrate WAG ERAs to evaluate risk to INEEL-wide ecological resources. This assessment is conducted to evaluate effects resulting from past contamination and their potential for adversely impacting INEEL-wide ecological resources including residual impacts from completed interim or remedial actions.

The OU 10-04 ERA will integrate the results of the WAG ERAs to determine whether contamination at the WAGs contributes to potential risk to populations and communities on an ecosystem-wide basis (over the entire INEEL). The fourth phase of the INEEL ERA process includes finalizing the OU 10-04 Record of Decision and associated remedial design/remedial action activities. The OU 10-04 ERA is contrasted with the previous phases of the process in Table F-48???



**Table F-48.** Comparison of waste area group ecological risk assessment components for phases of the INEEL-wide ecological risk assessment.

Component of Assessment	Screening Level Ecological Risk Assessment (Phase 1)	WAG ERA (Phase 2)	OU 10-04 Baseline ERA (Phase 3)
Stressor and receptor identification (contaminants and sites of potential concern)	Track 1 and Track 2 investigations and all FFA/CO sites and contaminants	SLERA COPC and site retention lists	WAG transition ERA COPC and site retention lists
Spatial scale	WAG assessment area	Sites within the WAG assessment area	OU 10-04 or WAG level for individual sites
Temporal scale	Current	Current, future (buried waste)	Current, future (buried waste)
Contaminant concentration in media of interest	Average concentration across the WAG—human health sampling	Average concentration for each site—human health sampling and modeling for buried waste	To be determined
Exposure assessment	Ecologically based screening level (EBSL) soil and water	Dose across media	Dose across media
Risk characterization	Screening level quotient—unranked	HQ-ranked	HQ-ranked and qualitative discussion
Cumulative risk	Multiple sites combined across the WAG—average concentration	Multiple contaminants—individual sites—average concentration	Multiple contaminants across multiple WAGs
Assessment endpoints	WAG functional groups and individual T/E species—semiquantitative	WAG functional groups or selected species (only for WAGs 6 and 10)—quantitative and qualitative	EPA assessment endpoint criteria (to be determined)—quantitative, semiquantitative, and qualitative
Measurement endpoints	Exposure model parameters	Exposure model parameters	To be determined—ecological components based on assessment endpoints and COPCs from waste area group ecological risk assessments (WAG ERAs).

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